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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/550,841

06/05/2006

Eigo Kubota

075834.00503

6055

33448

7590

10/31/2008

ROBERT J. DEPKE

LEWIS T. STEADMAN

ROCKEY, DEPKE & LYONS, LLC

SUITE 5450 SEARS TOWER

CHICAGO, IL 60606-6306

EXAMINER

LEWIS, BEN

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

10/31/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/550,841	Applicant(s) KUBOTA ET AL.	
	Examiner Ben Lewis	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/23/05</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-7 and 9-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Leboe et al. (U.S. Pub. No. 2002/0168556 A1).

With respect to claims 1, 2, 3, 4 and 13, Leboe et al. disclose a fuel cell thermal management system (title). With respect to temperature controlling means and the heat transfer relationship of the electrical equipment and the fuel cell, Leboe et al. teach that FIG. 4 illustrates generally one possible arrangement for circulating air (or some other suitable heat transfer gas) through apparatus 10. In the illustrated embodiment air is drawn into apparatus 10 through an inlet 34 by the operation of at least one blower 32. The inlet air (temperature controlling means) is passed over the surface of battery 18 and DC/DC power converter 20 (electrical equipment). As described further below, the incoming air may be separated into a first air stream 40 which is passed through reformer shroud 25 to accept radiant heat generated by the reforming process and a second air stream 42 which is conveyed directly to reformer 24 to provide a supply of burner air. The first air stream may be further subdivided into a substream 40(a) which

Art Unit: 1795

is circulated past fuel cell 16 and a second substream 40(b) which is used to dilute and cool the reformer exhaust. The various air streams and substreams are then merged at strategic locations within apparatus 10 and expelled through an outlet 36 (Paragraph 0040).

Leboe et al. also teach that substream 40(a) is diverted to regulate the temperature of fuel cell 16 (heat sink) at higher operating temperatures and substream 40(b) is used to cool and dilute the reformer exhaust (Paragraph 0063).

Leboe et al. also teach that the exemplary air flow patterns described are preferably under the control of microprocessor controller 28 which receives input from various temperature and air flow sensors (not shown). In one embodiment of the invention, controller 28 may be programmed to periodically reverse the direction of air flow. This enables the periodic expulsion of built-up debris from the interior of apparatus 10 through air inlet 34. Air inlet 34 and outlet 36 may also include conventional grills or deflector shields to filter debris and ensure the exhaust gas stream is ergonomically located for operator comfort (Paragraph 0051).

Leboe et al. also teach that the invention maintains the various components of the fuel cell apparatus within preferred operating temperature ranges while ensuring that exhaust gases and external surfaces of the apparatus do not exceed safe temperature, levels (See Abstract).

With respect to claim 5, Leboe et al. teach that heat transfer gas moving in the third flow path may comprise oxidant gas reacted in the fuel cell (Paragraph 0022).

With respect to claim 6, Leboe et al. teach that air stream 44 delivers oxidant air to fuel cell 16 and contains water when expelled from fuel cell 16. The hot air present in air stream 42 evaporates the water content of air stream 44 in evaporator 47, thereby cooling the merged exhaust stream 45 and maintaining it in a vapour state suitable for expulsion to the environment (Paragraph 0044).

With respect to claim 7, Leboe et al. teach that in one arrangement, the heat transfer gas is moved through the first flow path downstream from the DC/DC converter to accept radiant heat from the reformer. The method includes the step of transferring heat from the heat transfer gas to a source of fuel for the apparatus prior to introduction of the fuel into the reformer. The heat transfer gas moving in the third flow path may comprise oxidant gas reacted in the fuel cell (Paragraph 0022).

With respect to claims 9-12, Leboe et al. teach that in a preferred embodiment the heat transfer gas is air introduced into the apparatus through an inlet in communication with the environment. In one embodiment the air is introduced into the apparatus through a single inlet and exhausted from the apparatus through a single outlet. Preferably the air is exhausted at a temperature below 50.degree. C (Paragraph 0016).

Leboe et al. also teach that in the illustrated embodiment air is drawn into apparatus 10 through an inlet 34 by the operation of at least one blower 32. The inlet air (temperature controlling means) is passed over the surface of battery 18 and DC/DC power converter 20 (electrical equipment). As described further below, the incoming air may be separated into a first air stream 40 which is passed through reformer shroud 25 to accept radiant heat generated by the reforming process and a second air stream 42 which is conveyed directly to reformer 24 to provide a supply of burner air. The first air stream may be further subdivided into a substream 40(a) which is circulated past fuel cell 16 and a second substream 40(b) which is used to dilute and cool the reformer exhaust. The various air streams and substreams are then merged at strategic locations within apparatus 10 and expelled through an outlet 36 (Paragraph 0040).

3. Claims 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Leboe et al. (U.S. Pub. No. 2002/0168556 A1).

With respect to claims 14 and 15, Leboe et al. disclose a fuel cell thermal management system (title). With respect to temperature controlling means and the heat transfer relationship of the electrical equipment and the fuel cell, Leboe et al. teach that FIG. 4 illustrates generally one possible arrangement for circulating air (or some other suitable heat transfer gas) through apparatus 10. In the illustrated embodiment air is drawn into apparatus 10 through an inlet 34 by the operation of at least one blower 32. The inlet air (temperature controlling means) is passed over the surface of battery 18 and DC/DC power converter 20 (electrical equipment) (source of heat generation). As

Art Unit: 1795

described further below, the incoming air may be separated into a first air stream 40 which is passed through reformer shroud 25 to accept radiant heat generated by the reforming process and a second air stream 42 which is conveyed directly to reformer 24 to provide a supply of burner air. The first air stream may be further subdivided into a substream 40(a) which is circulated past fuel cell 16 and a second substream 40(b) which is used to dilute and cool the reformer exhaust. The various air streams and substreams are then merged at strategic locations within apparatus 10 and expelled through an outlet 36 (Paragraph 0040).

With respect to a casing see figs 1, 2 and 4..

Leboe et al. also teach that fuel cell 16 delivers raw DC current to a DC/DC converter 20 (Paragraph 0036).

Leboe et al. also teach that substream 40(a) is diverted to regulate the temperature of fuel cell 16 (heat sink) at higher operating temperatures and substream 40(b) is used to cool and dilute the reformer exhaust (Paragraph 0063).

Leboe et al. also teach that the exemplary air flow patterns described are preferably under the control of microprocessor controller 28 which receives input from various temperature and air flow sensors (not shown). In one embodiment of the invention, controller 28 may be programmed to periodically reverse the direction of air flow. This enables the periodic expulsion of built-up debris from the interior of apparatus 10 through air inlet 34. Air inlet 34 and outlet 36 may also include conventional grills or deflector shields to filter debris and ensure the exhaust gas stream is ergonomically located for operator comfort (Paragraph 0051).

Leboe et al. also teach that the invention maintains the various components of the fuel cell apparatus within preferred operating temperature ranges while ensuring that exhaust gases and external surfaces of the apparatus do not exceed safe temperature, levels (See Abstract).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leboe et al. (U.S. Pub. No. 2002/0168556 A1) in view of Hidaka et al. (U.S. Pub. No. 2002/0108740 A1).

With respect to claim 8, Leboe et al. disclose a fuel cell thermal management system (title) in paragraph 2 above. Leboe et al. do not specifically teach a carburetor. However, Hidaka et al. disclose an integrated piping plate for fuel cell power generation system (Paragraph 0015). wherein, FIG. 49 shows an example of a system diagram of an ordinary fuel cell power generation system. As shown in FIG. 49, a liquid fuel 441a, such as methanol, is vaporized by a carburetor 442 with the use of waste heat or the like of a reformer 449, and heated by a heat exchanger 443. Then, the vapor is introduced into a desulfurization device 444 together with part of a hydrogen-rich gas

Art Unit: 1795

from a CO converter 446 to have its sulfur content removed. The fuel gas, which has been desulfurized, is heated by a heat exchanger 448 together with steam 447 generated by a steam separator 445, and is then fed to the reformer 449. In the reformer 449, the fuel gas is reformed to generate a reformed gas rich in hydrogen (Paragraphs 0223-0444). Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the carburetor of Hidaka et al. into the fuel cell system of Leboe et al. because the carburetor would ensure more efficient reforming of fuel by providing an accurate air fuel mixture to the reformer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben Lewis whose telephone number is 571-272-6481. The examiner can normally be reached on 8:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ben Lewis/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795